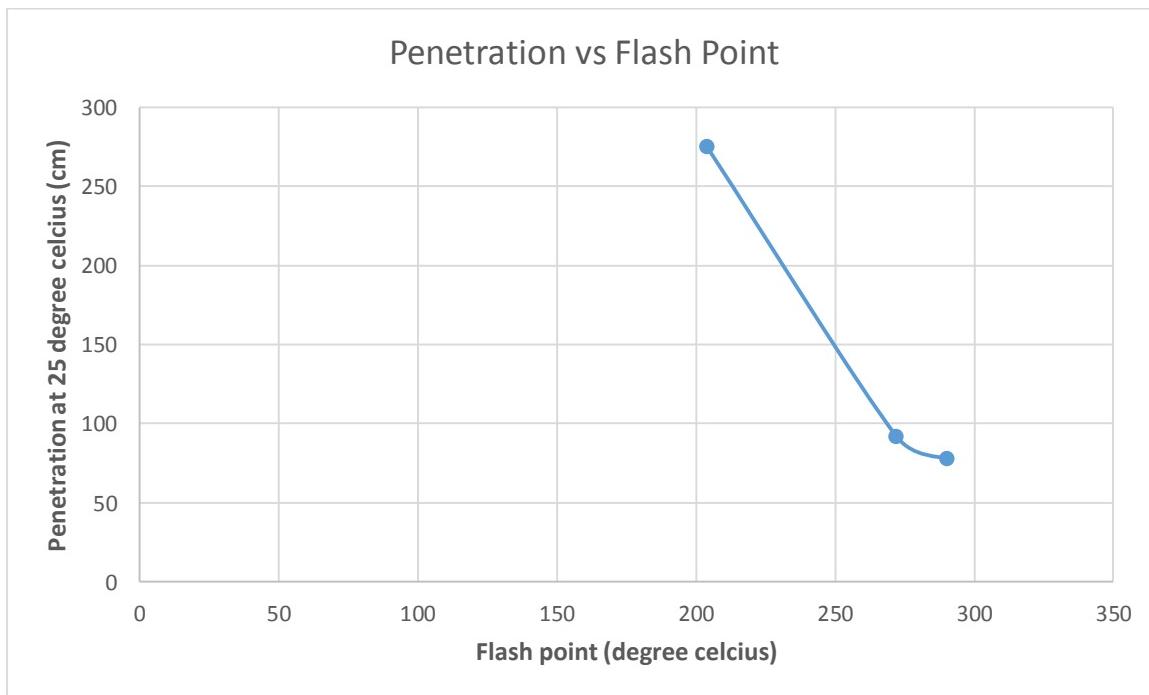


Answer to question 1

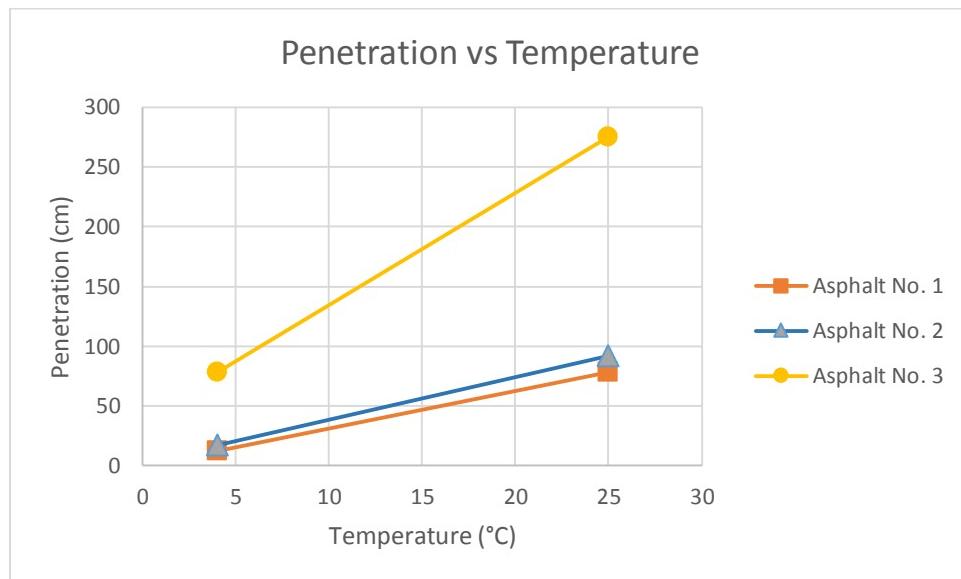
The penetration value of 78 of first asphalt cement sample is not in between any ASTM D946 penetration grade range. Available penetration grade ranges close to penetration value of 78 are grade 60-70 and 85-100. Selection of penetration grade of 60-70 is more reasonable. As all other properties of asphalt sample 1 are in the required property ranges of penetration grade 60-70, especially the Ductility at 25°C, (5 cm/min) after thin film oven test. The minimum requirement for grade 60-70 is 50 cm and for grade 85-100 is 75 cm, whereas the sample 1 has the tested ductility after thin film oven test of 62. Therefore, penetration grade 60-70 is more reasonable for asphalt sample 1.

Asphalt cement sample 2 is in the penetration grade 85-100, since its penetration value is 92. Other properties of the sample like flash point temperature, ductility and solubility in trichloroethylene are also in the required ranges of penetration grade 85-100. However, sample 2 has a low value of penetration and ductility after thin film oven aging compared to the ASTM scale for penetration grade 85-100.

Asphalt cement sample 3 is in the penetration grade 200-300, since its penetration value is 275. All other properties are also in the required ranges of penetration grade 200-300. However, solubility in trichloroethylene value is very close to minimum requirement of penetration grade 200-300.

Answer to question 2

The graph between the original penetration at 25°C (y-axis) versus the flash point (x-axis) illustrates that higher the penetration, lower the flash point. Flash point decreases with increasing penetration. This is because softer asphalts usually have a higher percentage of lighter ends which will “flash” at lower temperatures.

Answer to question 3

The graph between the original penetration (y-axis) versus the temperature at 4°C and 25°C (x-axis) indicates the temperature susceptibility of Asphalt sample number 1, 2 and 3. It is quite clear from the graph that the rank from low susceptibility to high susceptibility to temperature will be:

Asphalt No. 3 < Asphalt No. 2 < Asphalt No. 1